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"Scire est nescire, nisi id me Scire alius sciret."

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PSYCHOLOGICAL FACTORS IN DISEASE.

BY

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In all branches of Medicine, there is growing appreciation of the importance of emotional factors in disease, and contemporary literature shows this trend very clearly. As an example, Sir Maurice Cassidy has recently stated: "Beyond all question the most important advance in medical progress of recent years has been the recognition that psychological factors play an overwhelming part in the causation of invalidism, taken as a whole. It is now known that in panel practice the commonest diagnoses are 'debility,' 'dyspepsia,' 'gastritis,' 'anæmia,' 'neuralgia,' 'tachycardia,' and so on. And it is also known that the great majority of patients who are so diagnosed

are really the victims of some psychological disorder, usually an anxiety state or a conversion hysteria. Moreover, this state of affairs is not confined to the hospital class of patient. These disorders are even more prevalent among the well-to-do classes. They constitute, for example, 30 per cent. of the cases seen in consulting cardiological practice."

This challenging statement from one of the leading members of the profession is really an indication that the orientation of medicine is changing from the materialism of the nineteenth century, and this change is intimately concerned with our conceptions of illness. In reality illness is not an entity, but rather a reaction to the forces of environment. Our primitive ancestors appreciated the fact that a severe accident would cause a broken leg; later the effects of heat, cold and poisons were recognized, while in the last century the emphasis was chiefly laid on micro-organismal disease. Within the last thirty years it is generally recognized that food deficiencies must be added to these various extrinsic factors in the causation of illness, and now psychological disorders must be included in the list. They are in reality reactions in the "neurosis" system of the body, which is made up of the sympathetic system, the endocrines and the optic thalamus working in concert.

This neurosis system is essentially a defence mechanism against adverse factors in the emotional environment of the individual, and these factors have increased in importance of recent years for the following reasons:—

1. *The Insecurity of our Civilization.*—Contemporary literature is full of references to racial and

ideological problems, and the increased facilities for the dissemination of news undoubtedly bring these problems to the notice of the ordinary citizen to an extent that has never happened in the past.

2. *Urbanization.*—Our civilization to-day is based on the town as the unit, and the majority of our patients are leading lives totally at variance with those led in the past. As a result we have problems of small families, overcrowding, and lack of opportunities for physical recreation that must play an important part in the development of the individual. In addition, the rationalization of industry has resulted in a large proportion of the population working under comparatively rigid conditions and under the authority of other people, with the result that personal relationships play a prominent part in the individual's daily life. The lack of creativeness and the sense of dependency that are so frequently associated with contemporary employment are all in conflict with our instinctive urges.

3. *The Fear of Disease.*—On all sides our patients are being assailed with cleverly-worded advertisements stressing possible dangers to health and offering panaceas after they have succeeded in stimulating the sense of fear that is dormant in everybody. The majority of people are literate rather than educated, and are not in a position to criticize the slogans they encounter on all sides.

4. *Decline of Religious Values.*—This important aspect is self-evident in the contemporary world and must result in a very different attitude to problems as they arise in patients' daily lives. At first sight these subjects may appear to be extraneous to our concepts

of medicine and the causation of disease, but they are all capable of stimulating a sense of fear and insecurity with their attendant effects on the sympathetic system. Now all people of necessity become emotional when they encounter a difficulty, but the mature individual faces the problem objectively and maintains his functional integrity. Unfortunately the majority of our patients are in varying ways immature in that they have never quite grown up and still cling to many childish values that were helpful in early days, but are a hindrance in adult life. These immature people try to escape from their difficulties and this flight is associated with a sense of fear, together with resentment against the situation in question. These emotional disturbances are expressed in effects on viscera innervated by the autonomic nervous system, especially by its sympathetic division. It has been shown by Langley, Cannon, and others, that stimulation of this division causes changes throughout the whole body. Thus the hair stands on end, the digestive secretions are inhibited, the heart beats more quickly, the blood-pressure is raised, and the rectum and bladder are stimulated. These profound disturbances of the body equilibrium are in reality atavistic survivals from our primitive ancestors, as they enabled them to fight or to flee in the face of a sudden danger. The mechanism is of course still stimulated to-day by sudden peril, as for instance in a possible motor accident, but if the stimulation is protracted, the effects on the whole system must of necessity be very destructive. Although all viscera are influenced in this way by emotion, it frequently happens that one part may be picked out and its rhythm completely

altered, with the result that the patient becomes conscious of a mechanism that under healthy conditions works entirely without his knowledge. The reasons for this are various; in some cases the organ may be hereditarily inferior, as occurs in cases of asthma with a strong family history; in other cases part of the body may have particular significance for the person, owing to early training and parental example. Thus prolonged stresses of an emotional type will produce tachycardia in one person, a flatulent dyspepsia or a duodenal ulcer in the next, and vaginismus in the third.

METHODS OF DETERMINING ÆTIOLOGY.

Once it is agreed that psychic factors in the patient's background are intimately concerned with his presenting symptoms, it is essential that a complete history of the patient should be obtained so that the relative importance of the various factors can be accurately assessed. Inquiries must be made regarding occupation and the feelings the person has about his work, domestic life (particularly with regard to sex) and the attitude that the patient has to his particular illness. The latter is always important, as the fear of cancer or any disease from which some other member of the family may have suffered frequently complicates the clinical picture. This information can only be obtained by a specific technique in which all semblance of criticism is removed. Many people are frightened of what we think of them and will immediately avoid any particular aspect of their past if they think it is going to produce a sense of shame or disgust in the listener. This objectivity is essential in understanding

all psycho-neurotic disturbances and the same attitude must be displayed when information is obtained from relations or parents.

RELATION OF ORGANIC TO FUNCTIONAL DISORDER.

From what has been said above regarding the profound influence of the sympathetic system on all organic function, it follows that organic and functional changes are always present in varying degrees in every case. An individual who is suffering from what at first sight appears to be a straightforward organic lesion is at the same time being influenced by his own feelings and fears about his presenting symptoms; while, conversely, the alteration in rhythm and function that follows any prolonged sympathetic disturbance is bound to result in structural change. The nineteenth-century differentiation of disease into organic and functional is therefore out of date and to-day the problem is one of deciding the relative proportions of each aspect that is present in any given case.

CHARACTERISTICS OF PSYCHO-NEUROTIC ILLNESS.

Disturbances of the emotional self are not fully understood by the conscious mind, while the influence of the latter is particularly important in all cases where the functional element predominates. Although a great deal appears in the popular press to-day about the sub-conscious mind, it should be realized that there is no sharp demarcation between consciousness and unconsciousness. One merges gradually into the other. It is now generally agreed that all past memories and experiences are, so to speak, stored away and

inevitably influence our judgement and behaviour in any current situation. This state of affairs has been frequently compared to an iceberg of which only about one-eighth is visible above the surface, while the large bulk that is out of sight influences continuously the projecting portion. Although sub-conscious influences play a very important part in many functional disorders, at least half of these cases are capable of explanation and treatment on a conscious level.

Another important aspect of the problem which must be mentioned is the question of conflict. In all cases of psycho-neurotic illness there is a varying degree of conflict between the acquired self-regard of the individual, the "super-ego" of Freud and the instinctive drives of reproduction and self-preservation. The self-regard of the individual is dependent on early training and parental example, while our fundamental instincts are essentially hereditary and concerned with the preservation of the race. These two instincts may frequently be challenged on the conscious basis and conflict will result if the individual is unable to deal with the problem to his own satisfaction. Any state of conflict, whether conscious or unconscious, of necessity uses up a great deal of energy; hence the easy fatigability of the psycho-neurotic.

Although many cases of functional disorder can be adequately understood and treated on the conscious level, it is generally recognized that all such individuals have been the subject of conflicting sentiments in their earlier days, and that these have been rekindled by the present situation. These sentiments are essentially concerned with the relationship of the

individual to his parents and home situation, and the seeds of adult emotional problems are always laid in the early years of life.

The treatment of cases which are predominantly emotional in origin is both preventive and curative. Under the former heading must be considered the "iatrogenic" or doctor-created diseases. There is no doubt that many conditions arise through faulty handling at the beginning. Advice is sought by patients primarily because they are anxious and the alleviation of this anxiety forms an integral part of the treatment, irrespective of the underlying pathology. In some cases difficulties may arise because insufficient time is given to the case. Fear arises in the doctor's mind that he may have perhaps missed something and fear is one of the most infectious of conditions. In addition, the patient feels that the case cannot be fully understood in the absence of his own views on the subject. This latter point is especially important, as the fear of such conditions as cancer, tuberculosis, heart-disease and lunacy is extremely prevalent. In the absence of a sympathetic listener the patient keeps these ideas to himself and the state of indecision that results in his own mind adds a further complication to the picture.

On the curative side it is essential to assess the relative extent of physical and psychical disorder. As mentioned above, both elements are present in every case and one of necessity influences the other. In what may be called mixed cases, it is very advisable to draw the patient's attention to the emotional factors that may be present, even if physical treatment is indicated at the beginning.

The particular type of psychological treatment that is indicated in any particular case varies according to the age, intelligence, type of personality of the patient, and the time available. A detailed history is in itself a valuable therapeutic measure, especially in cases that are sufficiently intelligent to understand how somatic symptoms may arise from emotional causes. Some cases are best dealt with by straight persuasion. This method was highly developed by Dejerine and is very efficacious with suggestible people of limited intelligence. Suggestion is of course an integral part of all medical work irrespective of the type of treatment being given. It is extremely valuable in some psycho-neurotic disorders, and can be reinforced by light hypnosis.

Where the problem is due to a conflict arising from subconscious causes, some form of analysis is essential for an adequate cure. The prime object of this approach is to help the patients to understand themselves in the light of their past experiences and behaviour. It is only applicable to people with a reasonable degree of intelligence and not over fifty years of age. In practice it is of course combined with re-education which enables the patient to deal with his current problems on a more objective basis.

SUMMARY.

Psychological problems in medical and surgical work are much commoner than is generally appreciated; approximately 30 per cent. of all cases of illness fall into this group.

Emotional conditions are appreciated and registered by the "neurosis" system, which consists of the

sympathetic nervous system, the endocrines and the optic thalamus working in unison. As a result, somatic manifestations may occur in any part of the body.

The treatment is both preventive and curative. In all cases a full history should be taken, which will throw light on the social, marital and occupational problems in the patient's background. The type of psychological treatment depends on the age and intelligence of the patient rather than on the presenting symptoms. Persuasion coupled with an explanation of the mechanism involved is frequently sufficient in milder conditions, while more deep-seated problems demand some form of analytic investigation combined with re-education. Knowledge of the subject has increased very greatly of recent years and the future will see an even bigger extension of this aspect of medicine.

CEREBRAL MALFORMATIONS AND THEIR CLINICAL CONSEQUENCES.*

BY

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A SERIES of brains chosen from the Stoke Park Collection formed a demonstration designed to show:—

1. The rate of growth of the normal human brain during the first few months and years of life.

2. The complete failure of the defective brain to achieve such normal growth, and

3. The additional occurrence amongst defectives of cerebral malformations of pre-natal origin and peculiarly gross kind.

To give the best ocular demonstration of the foregoing objectives six brains were exhibited in each group in three horizontal and parallel series, as follows:—

A. UPPER ROW. NORMALS.

	1	2	3	4	5	6
Sex ..	Male.	Male.	Male.	Female.	Male.	Male.
Age ..	2 days.	2 mos.	10 mos.	2·6 yrs.	4·0 yrs.	6·0 yrs.
Product ..	52	109	141	204	226	241
Weight ..	118	246	285	474	496	569

* A demonstration given at the thirty-second Annual Meeting of the Association of Physicians of Great Britain and Ireland, held in Bristol on 2nd and 3rd June, 1938.

B. MIDDLE ROW. MENTAL DEFECTIVES.

	1	2	3	4	5	6
Sex ..	Male.	Female.	Male.	Male.	Female.	Female.
Age ..	5·5 yrs.	12·3 yrs.	13·2 yrs.	17·6 yrs.	18·3 yrs.	24·10 yrs.
Product ..	148	132	186	175	107	206
Weight ..	319	310	404	396	242	443

C. LOWER ROW. CEREBRAL MALFORMATIONS OF PRENATAL ORIGIN. (MENTAL DEFECTIVES.)

	1	2	3	4	5	6
Sex ..	Male.	Female.	Female.	Male.	Female.	Male.
Age ..	7·1 yrs.	13·5 yrs.	33·8 yrs.	4·4 yrs.	12·7 yrs.	7·2 yrs.
Product ..	224	180	177	265	299	228
Weight ..	131	416	391	600	701	439

To establish a comparison between two such variants as the normal and defective brain it is of the first importance that the methods employed shall be strictly uniform throughout and shall be the same for both normals and defectives. When this investigation was first planned as one of the objectives of the then recently established Burden Mental Research Trust, Professor R. A. Fisher, of the Galton Eugenics Laboratory, was insistent that the defective brains should not be compared with the results obtained by others, but with entirely fresh normal material. Hence the necessity of establishing at Stoke Park a sufficiently large series of normal controls, eventually obtained from the Bristol Hospitals through the courtesy of their staffs. The two series—normal and defective—are therefore strictly comparable by any of the several methods employed—such as product or weight, *i.e.*

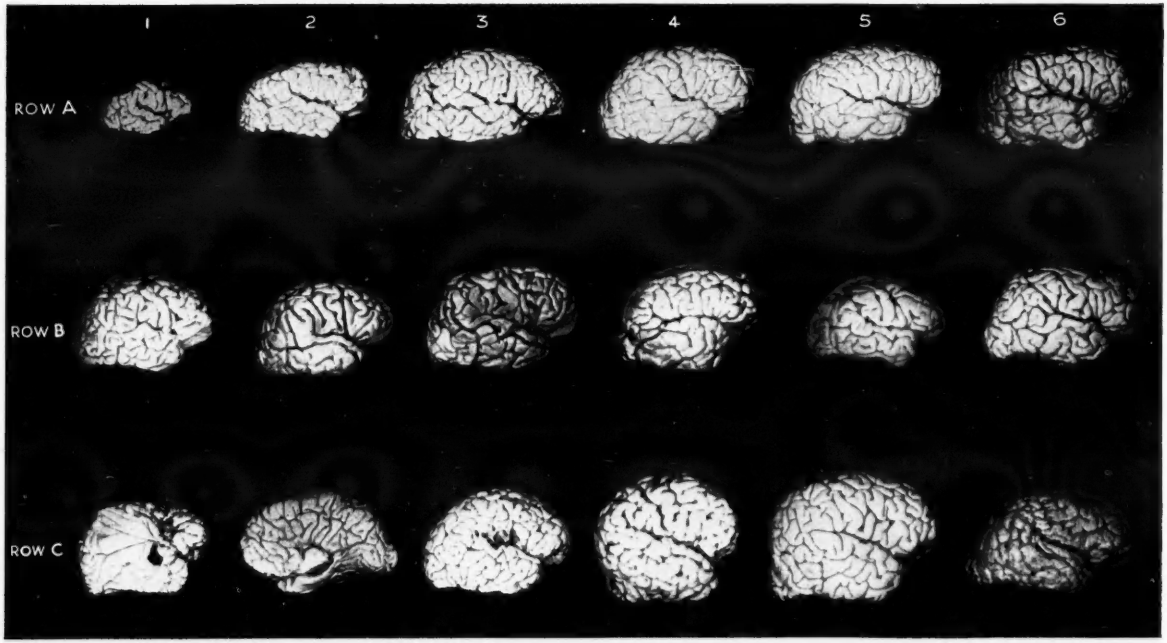

PLATE I

FIG. 1.

Row A.—Normals. *Row B.*—Mental Defectives. *Row C.*—Cerebral Malformations of Prenatal Origin. (Mental Defectives.)

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the weight of the stripped and dried right cerebral hemisphere.

Anthropologists and biometrically-minded clinicians have long been accustomed to measure the length, breadth and height of the living head and/or skull, and have done so in accordance with the precise instructions of the British Association for the Advancement of Science.

To record the dimensions of these brains in the same way was therefore desirable, as the advantages of one standardized procedure for the measurement of living head, skull and brain are too great to need justification. This uniformity of method enables a direct clinical comparison to be instituted on the living subject between the size of his head during life and the probable size of his brain. The possibility of being able to prognosticate the size of a patient's brain during life may in the near future have an importance all its own.

Product as an index of size for living head, dried skull, or post-mortem brain is obtained by multiplying together the three dimensions of length, breadth and height, and taking the first three units of the answer, to the nearest whole number, as the product of size.

On examining the products of the six brains of the upper row normal series, it will be seen that at two days old the product is 52. Two months later it has doubled itself and is then 109. About the end of the first year of life the brain-product is about treble that at birth. Half way through the third year of life it is almost four times what it was at birth, and thereafter proceeds more slowly, so that at or about the sixth birthday the brain-product, as an index of size, is nearly five times that of the new-born infant.

The defectives of the middle row B present a very different picture. Here the defectives are arranged in chronological order of age from 5·5 years to 24·10 years, and a study of the brain-products shows that in no single instance is their brain-size more than that of a normal two-year-old infant. It is particularly instructive to compare each one of these defectives with the corresponding product figure for the normal infants of the upper row. Case No. 5 in Row B is unusually illuminating. She was one of six children of incestuous origin, the parents being father and daughter, five of them being particularly gross idiots. In the case of the brain illustrated, death occurred at the age of 18·3. Both brain-product and weight are less than those of the normal two-months-old male figured in Row A. She was a diplegic idiot, wet and dirty, unable to walk, stand, speak, feed, wash or dress herself.

It is equally instructive to examine the weights of the right cerebral hemispheres of the normals of the upper row and the defectives of the middle one. The same facts emerge. The average non-pathological defective, irrespective of his age, seldom surpasses the normal two or three-year-old infant. During its growth from birth to adult maturity the average brain increases in weight by roughly 1,000 grms., and this increment is largely, but not entirely, due to the myelinization of the very numerous cerebral axones of the white medullary centre. If, therefore, a defective brain is found to weigh less than a comparable normal —both having been weighed under strictly similar conditions — to be appreciably smaller in size, and to possess a corpus callosum (through which all medullated neopallial commissural axones must pass) smaller than the normal, it is a reasonable inference

that that brain is deficient in its normal numbers of fully developed and properly functioning cortical neurones, and hence is incapable of achieving that type of mental reaction which distinguishes man from the animals.

It is these facts which give this comparison of defective and normal brains its importance. A study of the figures for the brain-size and weight as here given for the comparison of defective with normal is, in itself, a convincing explanation of why the defective is a defective.

In the third and lower row were exhibited six samples of the teratological monstrosities which pass for brains in some of the lower orders of defectives.

No. 1 is an extraordinary case of cerebral agenesia, that is, absence of the greater part of the cerebral cortex. It occurred in a male aged 7.1 years. In view of the fact that the brain was a thin-walled bag of fluid, the patient's attitude foetal, and the reflexes those of a spinal animal, the most astonishing thing of all is that an unconscious existence could be maintained on a primitive brain-stem spinal cord mechanism for so long a period as seven years. In the first 120 defective brains of the Stoke Park collection cerebral agenesia occurred three times, of which the brain exhibited was the worst and most interesting example.

No. 2 was a case of complete absence of the corpus callosum occurring in a girl who died at the age of 12.3 years, and who was regarded during life as being feeble-minded. Absence of the corpus callosum is a rare defect, but in the present series it was found completely absent three times, and partially so five times. Absence of the corpus callosum—partial or complete—is not in itself a sufficient cause of mental deficiency, but when, as in this instance, it is found in a brain which is too small for normal mental reactions, there is an adequate explanation of the girl's mental deficiency.

No. 3 was an example of that very rare condition ossification of the dura mater with a terminal hæmorrhage into both lateral ventricles. It was found in a female aged at death 33.8 years. One of the results of the long-standing pressure

from the bilateral ossified dura mater was an actual cortical destruction in the fronto-parietal operculum and adjacent superior temporal convolution. Professor T. B. Davie, who conducted the post-mortem examination, regarded the case as one of ossification in pachymeningitis hæmorrhagica interna due to congenital syphilis.

No. 4 was from a male aged 4.4 years. His head during life was enormous and of a very abnormal shape—the auriculo-vertical height being 161 mm. On opening the skull, which was thin and with synostosed sutures, the subdural space was found to be filled, especially over the vertex, with a thick, glairy, gelatinous substance, which in some places was about a quarter of an inch in thickness.

No. 5 was a case of megalencephaly occurring in a female aged 12.7. The total weight of the encephalon, unstripped, was 1,794 grms. That of the right cerebral hemisphere, stripped and dried, 701 grms. Whilst this brain was the heaviest in the defective series, still weightier examples of defective megalencephalic brains have been described, notably by the late Dr. Kinnier Wilson.

No. 6 was one of the two examples occurring in the series of classical microgyria, and occurred in a male aged 7.2 years. Examples of partial microgyria were found in 16.7 per cent. of the defective brains.

The collection of brains from which these 18 examples were taken comprises 146 defective and a check series of 106 normal. The former have been obtained from consecutive post-mortem examinations at Stoke Park Colony conducted in the main by Professor T. B. Davie of the University of Bristol.

The importance of this collection to neurological science may be judged from the facts that the brains are entirely unselected, come from defectives of all grades and ages, both sexes, and from many different parts of England and Wales. All the brains are mounted, preserved and stored in such a way as to make them readily available to any other investigator

—the right cerebral hemisphere for naked-eye study and the left for microscopic. Whilst much has already been achieved with the material available, very much more remains to be done, and can be done given the necessary trained investigators.

A communication such as this, dealing with only one small part of the material available, is clearly not the most suitable for a full or detailed account of the many problems raised by the investigation. Some of this is already in the press and will shortly be published in the form of an Atlas which will include a full account of the social, mental, clinical and neurological histories of the patients during life.*

This demonstration raises certain outstanding points for discussion :—

(*a*) The relevancy of euthanasia to the speechless, helpless idiots and especially to those whose brains clearly reveal the impossibility of their being human in anything but outward form. There can be no doubt that any legislation for permitting euthanasia should include not only those normal individuals suffering from lingering, painful, incurable diseases, for whom it would be voluntary, but also a compulsory measure for the extirpation of those travesties of human life whose brains were exhibited.

(*b*) The ante-natal origin of these gross developmental and teratological errors of brain and nervous system appears to be incontrovertible. No one of these brains could be the outcome of any injury during birth to a brain which had developed normally up to the time of birth.

* *A Cerebral Atlas illustrating the differences between the brains of mentally defective and normal individuals, with a social, mental, and neurological record of* 120 *defectives during life.* With 430 photographs. By R. J. A. Berry. Oxford University Press. Ready about September.

FIGS. 2, 3, 4 AND 5.

Photographs of four original models by R. J. A. Berry, showing the structure of four of the five types of cerebral cortex recognized and described by von Economo :—

1. Agranular type. "Motor" cortex.
2. Frontal type of cortex.
3. Parietal type of cortex. "Associational" cortex.
4. Polar type of cortex.

These models are constructed from beads of different sizes and colours to represent nerve cells, and red and blue silks to represent effector and receptor axons.

Granular Golgi type II cells. White square beads.
Granular small pyramidal cells. Red square beads.
Medium pyramidal cells. Circular red beads.
Large pyramidal cells. Oval large red beads.
Ganglionic cells. Round blue beads.
Fusiform cells. Blue square beads.

In the left-hand column of each model are shown micro-photographs of von Economo's cortical types, the one illustrated being indicated by lines round it. Below this is the same author's map of the cerebral cortex showing the exact locality of each of the five types. To the right of the foregoing is a thin vertical band showing the corresponding division of the cortex, by G. A. Watson, into supra-granular, granular and infra-granular cortical laminæ. In the central column is the model of beads showing the exact cellular elements of each of von Economo's cortical types. The various cortical laminæ, as described by von Economo and Shaw Bolton, are lettered L and numbered in Roman numerals. In the right-hand column these several laminæ are also named in accord with nomenclature adopted by either von Economo or Shaw Bolton. Medullated axons are indicated running into, or out of, the white medullary centre.

PLATE II

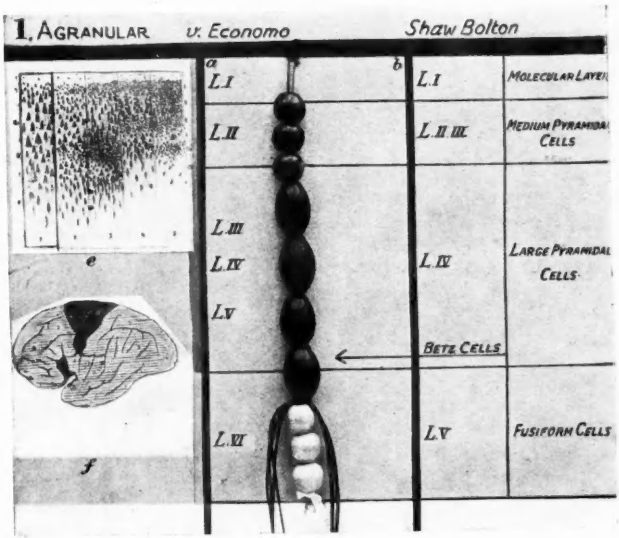

FIG. 2.

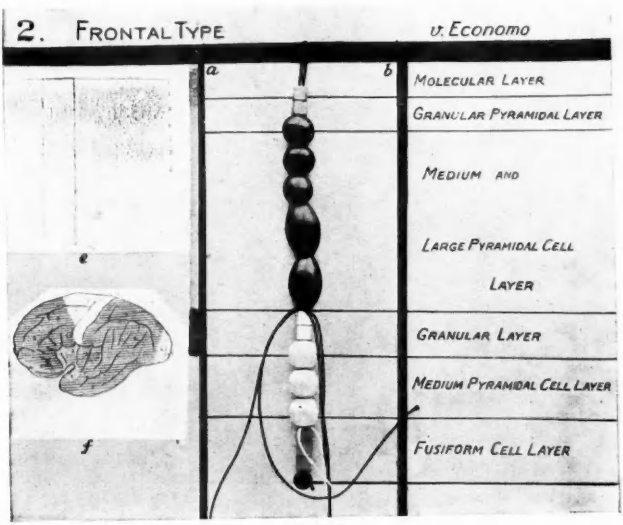

FIG. 3.

PLATE III

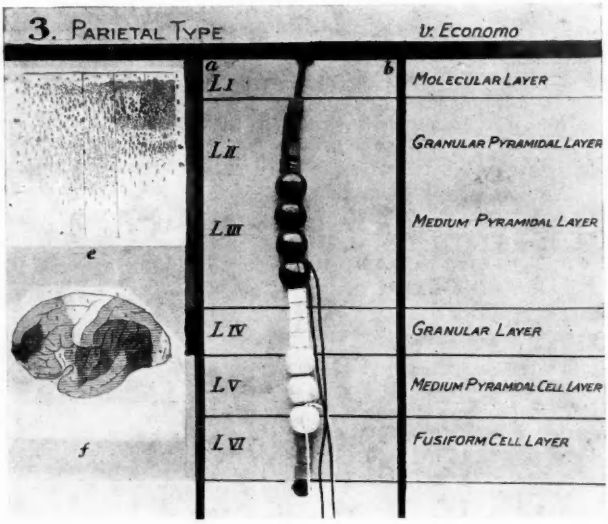

Fig. 4.

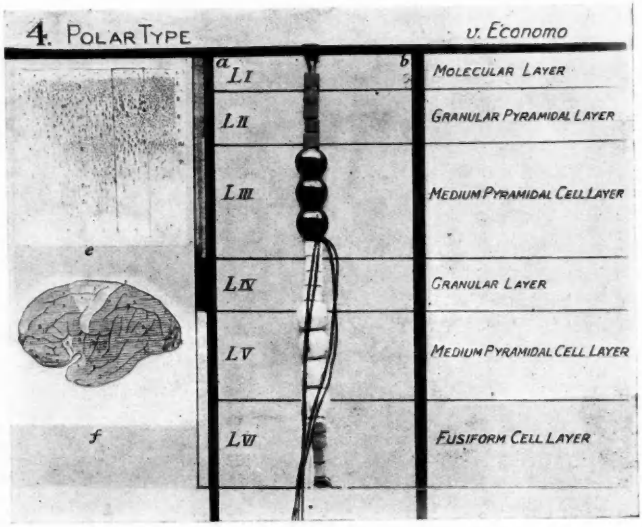

Fig. 5.

PLATE IV

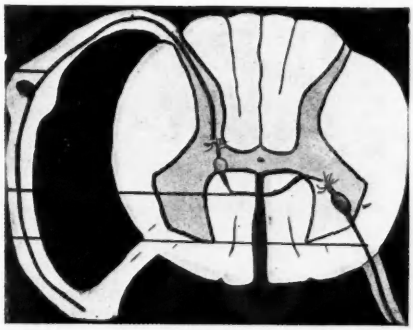

FIG. 6.—The neuronic arc with single internuncial neuronic element.

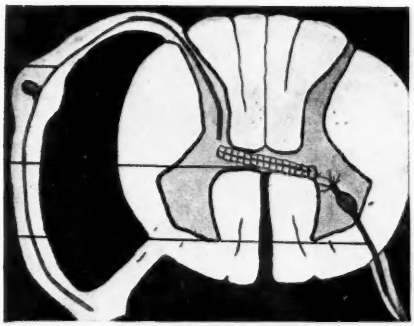

FIG. 7.—A theoretically constructed neuronic arc with numerous granular internuncial neuronic elements.

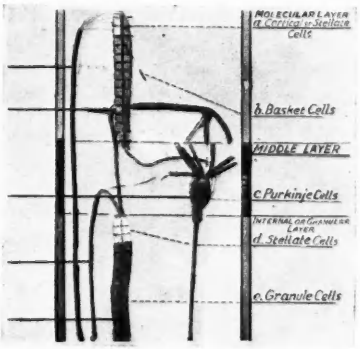
Climbing fibres as receptor neurones
Cortical and basket cells as granulous internuncial neurones
Purkinje effector neurone
Moss fibres as receptor neurones
Stellate and granular cells as granulous internuncial neurones
MOLECULAR LAYER
a. Cortical or Stellate Cells
b. Basket Cells
MIDDLE LAYER
c. Purkinje Cells
INTERNAL OR GRANULAR LAYER
d. Stellate Cells
e. Granule Cells

FIG. 8.—The supra segmental neuronic arc as found in the cerebellum with very numerous internuncial neurons of granular type interposed between the incoming or receptor limbs of the arc, and the outgoing or effector limbs.

PLATE V

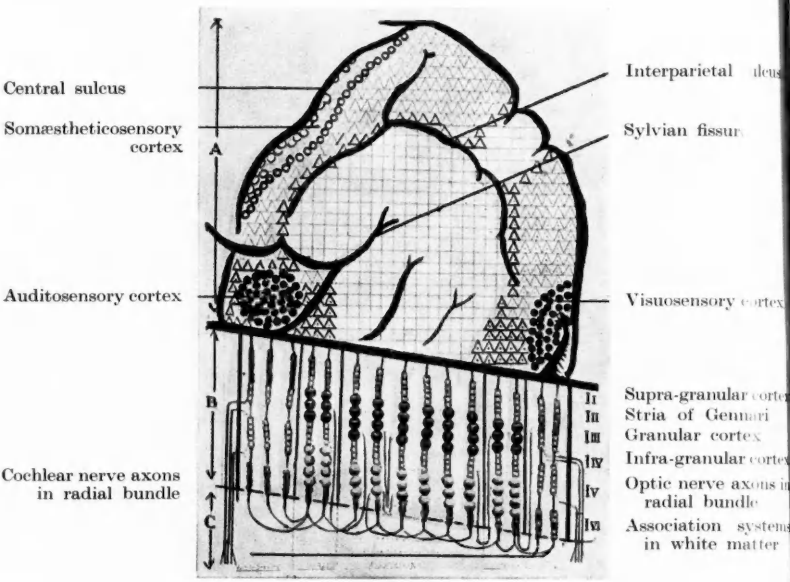

FIG. 9.

Photograph of an original model (R. J. A. Berry) of part of the left cerebral hemisphere seen in two dimensions.

Upper part. Cortical surface. Primary receptor zones in circles; secondary receptor zones in triangles; association areas in squares.

Lower part. Section through the cortex at right angles to the upper part showing the construction, as modelled in beads after the method described in Figs. 4 and 5, of the areas concerned. After von Economo's microscopic studies.

From left to right.

Auditosensory (somæstheticosensory) area.	Economo:	Type 5	cortex.
Auditopsychic area.	,,	,, 4	,,
Association area.	,,	,, 3	,,
Visuopsychic area.	,,	,, 4	,,
Visuosensory area.	,,	,, 5	,,

(*c*) The relationship of mental deficiency to criminal tendencies is more open to difference of opinion. One observer with first hand knowledge of one of the larger London prisons considers that feeble-mindedness is not common amongst the criminals in that prison. Others are inclined to the view more generally held that at least 50 per cent. of criminal offences are the work of the higher grades of feeble-minded or of the lower grades of dull normality.

(*d*) The utility of head measurement as a clinical aid, particularly amongst infants and young children, and the relative advantages of circumferential measurements over the more difficult ones of length, breadth and height, is a fruitful topic of discussion. Whatever individual preferences or prejudices may exist on craniometrical methods, the desirability of a closer contact between biometricians, clinicians and criminologists is universally admitted.

The use of various bead models of the spinal cord, cerebellum and cerebral cortex to explain some of the microscopic defects of the brain furnishes also a graphic method of demonstrating the dependence of some of the social problems of our times on these defects.*

When the teaching of neurological science can, with the aid of such models, be thus simplified and the subject be freed from some of the redundant nomenclature of its earlier days—and there is no reason why it should not be—the study of neurology and psychology will become more interesting, more instructive and more understandable. Then, too, it will achieve a greatly enhanced all-round utility.

* Figs. 2, 3, 4, 5, 6, 7, 8 and 9 are reproduced from models designed and invented by the author, and are included by kind permission of Mrs. R. G. Burden and Messrs. Macmillan & Co. Ltd.

PLATE V

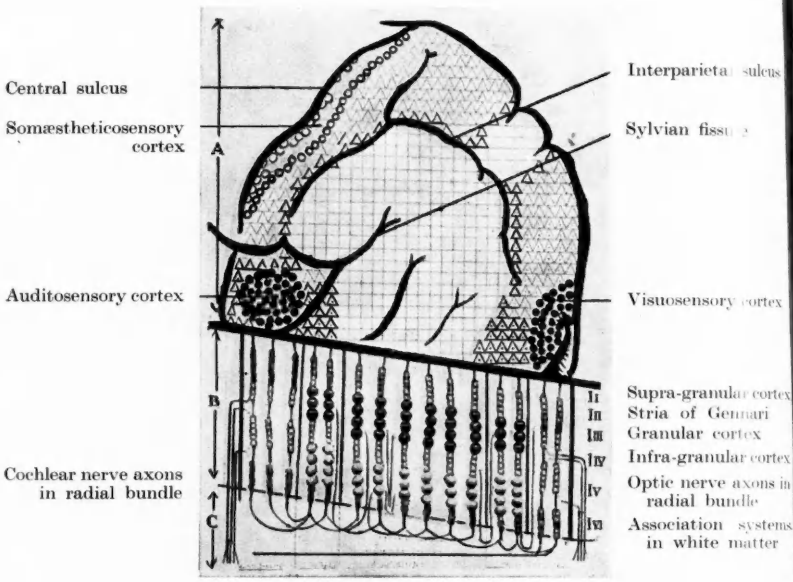

FIG. 9.

Photograph of an original model (R. J. A. Berry) of part of the left cerebral hemisphere seen in two dimensions.

Upper part. Cortical surface. Primary receptor zones in circles; secondary receptor zones in triangles; association areas in squares.

Lower part. Section through the cortex at right angles to the upper part showing the construction, as modelled in beads after the method described in Figs. 4 and 5, of the areas concerned. After von Economo's microscopic studies.

From left to right.

Auditosensory (somæstheticosensory) area.	Economo:	Type	5 cortex.
Auditopsychic area.	,,	,,	4 ,,
Association area.	,,	,,	3 ,,
Visuopsychic area.	,,	,,	4 ,,
Visuosensory area.	,,	,,	5 ,,

(*c*) The relationship of mental deficiency to criminal tendencies is more open to difference of opinion. One observer with first hand knowledge of one of the larger London prisons considers that feeble-mindedness is not common amongst the criminals in that prison. Others are inclined to the view more generally held that at least 50 per cent. of criminal offences are the work of the higher grades of feeble-minded or of the lower grades of dull normality.

(*d*) The utility of head measurement as a clinical aid, particularly amongst infants and young children, and the relative advantages of circumferential measurements over the more difficult ones of length, breadth and height, is a fruitful topic of discussion. Whatever individual preferences or prejudices may exist on craniometrical methods, the desirability of a closer contact between biometricians, clinicians and criminologists is universally admitted.

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* Figs. 2, 3, 4, 5, 6, 7, 8 and 9 are reproduced from models designed and invented by the author, and are included by kind permission of Mrs. R. G. Burden and Messrs. Macmillan & Co. Ltd.

It is most earnestly to be hoped that the study of the material at Stoke Park and demonstrations such as this will assist in bringing us back to those fundamentals of all mental science—anatomy, physiology and pathology—fundamentals from which psychology should never have departed.

THE USE OF PROTAMINE INSULIN.*

BY

J. A. NIXON, C.M.G., M.D., F.R.C.P.,

Emeritus Professor of Medicine in the University of Bristol.

THE recent introduction of delayed action insulin has rendered the treatment of diabetes a good deal more tolerable to the patient without greatly increasing the doctor's difficulties. The older form of insulin was freely soluble and hence was rapidly absorbed. Its effect was rapidly felt and almost as rapidly exhausted. Hence there were frequent hypoglycæmic reactions which alarmed the patients and sometimes led to their refusing to continue a treatment which appeared to be and was in fact dangerous.

In order to avoid sudden falls in blood-sugar various attempts have been made to prolong the action of insulin, and to imitate the natural mechanism of regulation, which always amounts to minute doses being added to the blood in response to calls which we cannot recognize or imitate.

From a study of normal blood-sugar curves it is established that there is a uniform rise during the night, ending with a sharp, steep rise towards morning. During the day numerous exogenous influences lead to irregular rises and falls. The early morning rise which is observed normally becomes much more pronounced during treatment with insulin.

* A paper read at the Meeting of the British Medical Association (Bath, Bristol and Somerset Branch), on Wednesday, 27th April, 1938.

At the beginning of 1936, Hagedorn of Copenhagen introduced a combination of insulin with protamine which was proved to have a much slower action than ordinary insulin. This combination he called protamine insulinate. The compound is made with protamine prepared from the sperm of the rainbow trout (*salmo irideus*).

A still more prolonged effect is obtained by the addition of zinc to protamine insulin. By both these methods an insoluble compound is formed, the insolubility of which is greatest at the reaction of normal plasma pH. 7·3. At this reaction it is injected as a suspension—the deposit in the subcutaneous tissues consists of solid particles, and a fluid of constant insulin concentration is formed from which absorption slowly takes place. Thus its effect is more uniform and of longer duration than ordinary insulin, as may be seen from the following blood-sugar curves :—

FIG. 1.—Shows the blood-sugar curves in a normal man, fasting, after the injection of 30 units of ordinary and of protamine insulin. The dotted line shows the curve after ordinary insulin, the solid line that which follows protamine insulin. It will be seen that after ordinary insulin the blood-sugar is returning to the normal level (even though no food is taken) after the second hour.

After protamine insulin the fall in blood-sugar continues until at the sixth hour it has reached the dangerously low level of 40 mgm. per 100 c.c.

FIG. 2.—Shows the blood-sugar curves in a normal man who takes his ordinary meals, breakfast, lunch, tea and supper, after the injection of 20 units of ordinary insulin and the injection of protamine insulin. The dotted and solid lines have the same meaning as in Fig. 1. It is evident that the effect of protamine insulin is more protracted, and the blood-sugar remains low in spite of breakfast and lunch, whilst it begins to rise just before tea. After ordinary insulin the blood-sugar begins to rise even before lunch.

NORMAL MAN.

Fasting. *Meals.*

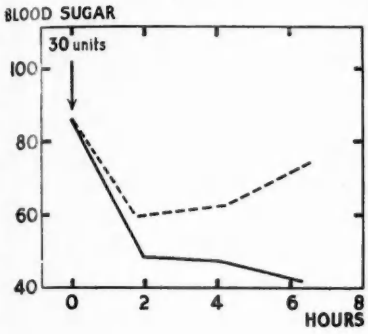

FIG. 1.

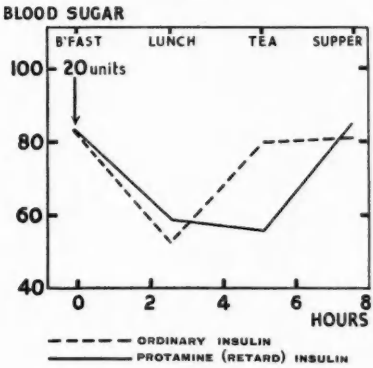

FIG. 2.

Comparison between ordinary insulin and protamine (retard) insulin in a normal man. In the fasting man the curves show rapid recovery from effect of ordinary insulin, but protamine (retard) insulin still acting six hours after the injection and producing hypoglycæmic attack. On a fixed diet the curves show the effect of ordinary insulin "buffered" by lunch, but protamine insulin continues to act strongly until its action is "buffered" by tea.

Reproduced by permission of DR. IZOD BENNETT *and* "THE LANCET."

DIABETIC MAN.

Ordinary Insulin. *Zinc Protamine Insulin.*

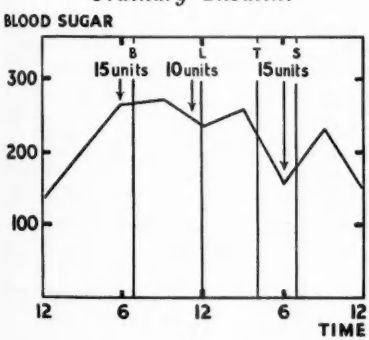

FIG. 3.

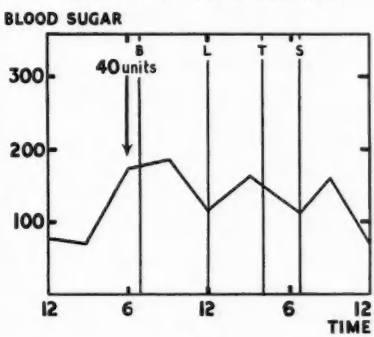

FIG. 4.

Blood-sugar curves from a man aged 65 years; the first while taking ordinary insulin, the second taking zinc protamine insulin. The diet was the same on both occasions.

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FIGS. 3 and 4 refer to the effects on a diabetic subject, and demonstrate the contrast between the effects of ordinary and zinc-protamine insulin.

Three injections of ordinary insulin are given as against one of zinc-protamine insulin. The total number of units (45) is the same.

The points to notice are that in Fig. 4 after zinc-protamine insulin the general level of the blood-sugar is much lower, and in particular that the level remains low during the greater part of the night and rises steeply just before breakfast.

THE DIFFERENCE IN ACTION BETWEEN PROTAMINE INSULIN AND ZINC-PROTAMINE INSULIN.

Dr. Izod Bennett has published a table which sets out the varieties and times of action of the different types of insulin.

TABLE I.

Types of Insulin.

Type of Insulin.	Synonyms.	Commencement of Action.	Maximum Effect.
Ordinary insulin.	—	20–40 min.	3 hrs.
Insulin retard.	Protamine insulin ; Hagedorn's insulin.	1–3 hrs.	6–8 hrs.
Zinc insulin.	Protamine insulin (with zinc) suspension.	9–11 hrs.	15–20 hrs.
Zinc crystalline protamine insulin.	Protamine-insulin Organon.	8–12 hrs.	12–20 hrs.

From these tables he deduces the advantages and disadvantages of the different types, but he does not stress quite clearly the differences between protamine insulin with and without zinc. I am not sure whether these differences have so far been very clearly defined. It is generally recognized that ordinary insulin produces a rapid fall in the blood-sugar, followed by a rapid rise, which creates a need for more than one injection in

twenty-four hours in most cases of diabetes. When Hagedorn's protamine insulin is used the fall in blood-sugar begins soon after the first meal following the injection, reaches its maximum in six or eight hours (that is to say, before night if given in the morning), and its effect is completely exhausted before the dose is given next day.

With zinc-protamine insulin the fall in blood-sugar does not begin until nine to eleven hours after the injection, the maximum effect is not reached until fifteen or twenty-four hours after injection, and the effect is not exhausted when the time for the next dose comes round.

The advantage lies with the non-zinc compound, because the end point of its action is reached within twenty-four hours.

My general impression is that at present protamine insulin without zinc is to be preferred to zinc-protamine insulin.

PREPARATION AND ADMINISTRATION OF PROTAMINE INSULINS.

Hagedorn's plan was to supply the protamine insulin in two phials, one of which contained 4 c.c. containing 50 units of water-soluble insulin, and the other 1 c.c. of a suitably buffered solution of protamine.

The protamine solution is added to the insulin solution just before use, and remains stable for a limited number of days (10 to 14).

It was later found that the addition of zinc to the protamine insulinate, in the proportion of 0·2 mg. zinc per 100 units of insulin, rendered the precipitate more stable, and the injection could be supplied in a single phial. There is a disadvantage in each form. If the 2-phial preparation without zinc is used, the insulin

remains potent for at least eighteen months, provided the protamine solution has not been added. After its addition the mixture must be used within a few days. When the zinc-protamine insulin in a single phial is used the suspension only remains potent for six months. This may be a matter of indifference to an individual patient, but it necessitates hospitals and pharmacists keeping only small stocks. In either case the suspension must be shaken up before injection.

At first Hagedorn and his co-workers recommended an injection of protamine insulin at night and one of ordinary insulin in the morning. The use of two injections of protamine insulin daily is certainly inadvisable, because the full effect of the first injection is not exhausted for about twenty-four hours.

The general opinion of those who have had most experience is that the morning before breakfast is the best time for administering protamine insulin. If a single dose is inadequate, a second dose of ordinary insulin can be given in the evening. If the dose is given in the morning there is no reason to fear a hypoglycæmic reaction, because the immediate effect of protamine insulin is small, and before its full sugar-reducing effect is exerted the patient will have had breakfast and the mid-day meal.

In patients who require exceptionally large doses a difficulty arises from the bulk of the injection. At present 40 units per 1 c.c. is the limit. There is some doubt whether a more concentrated solution, say of 80 units per 1 c.c., is absorbed completely.

A single injection of more than 1 c.c. is usually uncomfortable, though in my experience the local reaction is greater with ordinary than with protamine insulin. I have not found patients object to 1·5 c.c., *i.e.* 60 units.

Wilder has pointed out that there is an advantage in giving all the insulin for the day in a single injection before breakfast, because then the qualitative test of the early morning urine for sugar becomes an accurate guide to dosage.

If the morning urine contains sugar the dose of insulin is too small and may be increased with safety. If there is no sugar the dose is adequate, and a hypoglycæmic reaction is an indication for a smaller dose.

Our aim therefore is to secure sugar-free urine in the morning without producing any hypoglycæmic reactions, and this is easier to do with delayed action protamine insulin than with ordinary insulin, which produces a much more rapid fall in blood-sugar.

As regards the initial dosage—if the patient is already taking ordinary insulin one should substitute the same number of units of protamine insulin and give it in a single morning injection. If necessary a supplementary evening dose of about 60 per cent. of the previous dose of ordinary insulin may be given.

Alcohol in the syringe must be avoided.

MODE OF ONSET OF HYPOGLYCÆMIA.

In any of the forms of delayed action insulin the mode of onset of hypoglycæmia needs to be specially observed. Whereas with ordinary insulin the fall in blood-sugar is abrupt and usually attended by premonitory symptoms which the patient may recognize, the response to treatment with glucose or adrenalin is generally prompt and, even if untreated, the hypoglycæmia is often only transient, so that the patient may recover without any treatment. On the other hand, with delayed action insulin the fall in blood-sugar may be so gradual that no premonitory symptoms are experienced. Moreover, the fall is so

slow that a much lower level of blood-sugar has to be reached before any hypoglycæmic symptoms present themselves: the subjective warning symptoms of faintness, perspiration, trembling and emptiness are frequently absent and the patient becomes deeply comatose without other warning.

Since the effect of these types of insulin is so slow the response to treatment can be expected to be slow also. The rapid recovery after adrenalin or glucose does not occur, and when apparent recovery has taken place the effect of the delayed action insulin may outlast the effects of the glucose administered so that repeated administration of glucose is essential. In some reported instances hypoglycæmic symptoms have been delayed until the blood-sugar had reached 40 mgm. per 100 c.c.

It will readily be appreciated that to restore a patient from this degree of hypoglycæmia with insulin-action still unexhausted is much more problematical than in a case where hypoglycæmia manifests itself with the blood-sugar in the neighbourhood of 60 mgm. and the insulin-action known to be short-lasting.

Theoretically we might assume that the most rapidly acting form of insulin should be employed to combat coma. The *Lancet*, in an editorial (6th March, 1937), said that most authorities agree that ordinary insulin should always be preferred for this most dangerous complication.

Experience at the Mayo Clinic, and that of Rabinowitch and his colleagues, suggest that protamine insulin may be successfully employed in cases of severe acidosis. But the practice at the Mayo Clinic is to give from 50 to 100 units of protamine insulin without delay, and to follow this up with multiple doses of ordinary insulin as may be indicated by examinations of the blood-sugar and the urine.

DIETS WITH PROTAMINE INSULIN.

All observers are agreed that the diet need not be so strictly regulated with protamine insulin. The patient may be allowed a good deal more latitude, and may to some extent be guided by his own appetite as regards the amount eaten at a particular meal. For some years past I have allowed diabetic patients to determine the amount they eat. I let them select their own diets within reason, and ask them to keep to approximately the same amounts for each day. The size of each meal may vary considerably so long as the total intake for the day does not vary materially.

Some recent work by McCance and Widdowson at

TABLE II.

Daily Food Intake of Sixty-three Men of the Middle Class. Summary of Results.

	Average.	Maximum.	Minimum.	Standard Deviation.
Total calories per day ..	3,067	4,955	1,772	714
Calories per kg. body weight (normal weight for height and age)	43·8	74·6	25·2	11·3
Total protein (g. per day) ..	97·6	167	53	23·8
Animal protein (g. per day) ..	66·6	121	30	19·2
Total fat (g. per day)	129·4	215	69	35·0
Total carbohydrate (g. per day)	348	589	171	86·0
% of calories from protein ..	13·1	19·3	8·3	1·9
% of calories from fat ..	39·1	50·8	29·0	4·9
% of calories from carbohydrate	46·7	59·8	33·5	5·4
Calcium (g. per day)	0·87	1·96	0·36	0·36
Total phosphorus (g. per day)	1·61	2·79	0·87	0·44
"Available" (non-phytin) phosphorus (g. per day) ..	1·57	2·73	0·86	0·42
Total iron (mg. per day) ..	16·8	28·5	7·8	4·64
"Available" (inorganic) iron (mg. per day)	10·8	18·7	5·3	2·80
Intake of milk (pints per day) ..	0·58	1·46	0	0·32
Intake of meat (oz. per day) ..	5·2	11·1	1·4	2·0
Intake of bread (oz. per day) ..	7·6	16·2	0·6	3·4
Calories per penny	117	165	53	23·6

N.B.—The sum of the percentages of calories derived from protein, fat and carbohydrate is less than 100 because a small percentage of the calories is derived from alcohol.

From "A Study of English Diets by the Individual Method," Part I, Men, by E. M. Widdowson, *Journal of Hygiene*, vol. xxxvi., 1936, p. 274.

King's College Hospital has thrown a great deal of light on the individual variations in the selection of adequate diets. They have studied the daily food intake of sixty-three men and sixty-three women of middle class, whose circumstances were such that financial considerations did not necessitate any undue economies. The resulting maxima and minima are astonishing. Each individual considered himself or herself adequately nourished for carrying on his or her daily work. Their weights remained steady. Those who ate largely did not seem overfed, and those who ate sparingly did not appear undernourished.

TABLE III.

Daily Food Intake of Sixty-three Women of the Middle Class. Summary of Results.

	Average.	Maximum.	Minimum.	Standard Deviation.	Average expressed as a percentage of the mean value for men.
Total calories per day ..	2,187	3,110	1,453	388	71
Calories per kg. body weight (normal weight for height and age)	35·5	55·6	26·6	7·6	81
Total protein (g. per day) ..	67·3	90·0	28·0	12·4	69
Animal protein (g. per day)	46·0	64·0	9·0	11·3	69
Total fat (g. per day) ..	100·5	151	63	20·6	77
Total carbohydrate (g. per day)	233	384	113	58·5	67
% of calories from protein ..	12·8	17·3	6·9	2·2	—
% of calories from fat ..	42·7	54·9	32·6	4·7	—
% of calories from carbohydrate	43·6	56·5	16·7	6·0	—
Total calcium (g. per day) ..	0·63	1·16	0·23	0·16	72
Total phosphorus (g. per day)	1·13	1·72	0·48	0·25	70
" Available " (non-phytin) phosphorus (g. per day) ..	1·09	1·62	0·45	0·22	69
Total iron (mg. per day) ..	11·4	17·3	5·5	2·50	68
" Available " (inorganic) iron (mg. per day)	7·9	12·4	5·0	1·64	73
Intake of milk (pints per day)	0·45	0·86	0	0·17	78
Intake of meat (oz. per day)	3·0	6·0	0·1	1·2	60
Intake of bread (oz. per day)	4·5	8·1	1·2	1·6	56
Calories per penny	109	166	29	21·4	—

From " A Study of English Diets by the Individual Method," Part II, Women, by E. M. Widdowson and R. A. McCance, *Journal of Hygiene*, vol. xxxvi., 1936, p. 299.

My own experience is that diabetic patients, when allowed to select their own diets—and sugar or jam are deliberately excluded—rarely take as much as 3,000 calories daily for men and 2,000 calories daily for women. Speaking generally, a diet moderately low in carbohydrate is more easily controlled by a single dose of insulin than a very generous carbohydrate diet. This is just as might be expected.

Reviews of Books

The Doctrine of Signatures. By S. BUCHANAN. Pp. xvi., 205. London: Kegan Paul, Trench, Trubner & Co. Ltd. 1938. Price 7s. 6d.—The author of this book is the Professor of Philosophy in the University of Virginia. He has turned aside for a short while to make a study of the study of medicine. He does not pretend to any knowledge of the practice of the medical art. He places medicine at the head of the Natural Sciences. "It has," he says, "a record maximum of knowledge and a minimum of wisdom, to say nothing of practical and philosophical wisdom." He offers this doctrine of signatures to satisfy "our vague yearnings for an integral medical science." It is not quite clear who has these vague yearnings; however, he puts forward the doctrine because "it says that medical knowledge and skill consists in seeing the connections between symptoms and remedies." He gives the illustration that it is "easier to see the signatures themselves . . . as when the extract of the heart-shaped leaves of the foxglove is called the specific for angina pectoris." This he terms "a classic illustration." It seems almost sacrilegious to peer any further into this mystic symbolism! Professor Buchanan's historical account of the development of the liberal arts is interesting, especially when he traces out the successive meanings that have attached to the word "grammar," and its relation to "rhetoric" and "logic," the other two elements of the *trivium*. The modern doctor is credited with a larger acquaintance with the methods of Aristotle and Galen than he can claim. Professor Buchanan tells us that according to Galen's teaching "the physiologist detects the structure of the hierarchy of forms in any organ as its four causes, material, formal, efficient and final." Galen may indeed have contributed something to the evolution of medicine but his contribution was certainly not contained in jargon of this sort. Professor Buchanan claims that "Aristotle and Galen are the mediums through which we see, often unawares, not only our scientific problems of the present, but even the problems of common sense that any practiser of the medical arts has to face daily." Somehow the thread of Greek and Hippocratic medicine

seems to pass through the hands of the artists like Pheidias and Praxiteles to a Leonardo da Vinci rather than through the minds of philosophers. It is doubtful if Galen enriched medicine at all, even though he may have preserved some knowledge. After Leonardo came Vesalius and to him succeeded Harvey—these men laid the foundations of our modern medical art because they were artists, not because they were philosophers. Medicine owes little or nothing to the " systems " which men have invented for its study and practice. Philosophy and metaphysics have added nothing to our knowledge and understanding of medicine. Professor Buchanan might do worse than abandon his contemplation of " signatures " and study the effects on medicine of Auenbrugger's knowledge of music, and of Pasteur's accomplishments in the art of drawing and painting. Galton knew the value of this artistic sense to scientific progress. He found in youth a high proportion who exhibit the faculty of mental imagery and artistic perception. He deplored that this faculty which gives accuracy to our perceptions and justness to our generalizations runs a risk of being suppressed by our bookish and wordy education and of being deliberately starved by the lazy disuse of philosophers. Is it unjust to Professor Buchanan to suggest that his *Doctrine of Signatures* is bookish and wordy ?

The History of the Forceps. By V. MØLLER-CHRISTENSEN. Pp. xx., 298. Illustrated. London : Oxford University Press. 1938. Price 20s.—This interesting historical study is translated from the Danish. There are upwards of 400 illustrations, and the writer has travelled all over the world to obtain his material, as well as making a special study of early literature. The first surgical forceps on record was produced in Egypt about 3300 B.C. This appears to be an original invention. There were forceps in use in Denmark in the Bronze Age. The evolution of the artery forceps is also given consideration.

Text-book of Nutrition. By J. A. NIXON, C.M.G., M.D., F.R.C.P., and D. G. C. NIXON, M.B., B.S., M.R.C.P., L.R.C.P. Pp. xiv., 219. London : Oxford University Press (Humphrey Milford). 1938. Price 7s. 6d.—The subject of nutrition must always be of first importance to all men and women, nations and, indeed, the whole animal kingdom. Yet there is probably no subject on which more rubbish has been written and said, not only by the advocates of various fads, but even by those

who ought to be better informed. We can therefore heartily welcome this exceedingly valuable account of the *known facts*. As the authors are careful to point out, nutrition embraces a great deal more than mere food and drink: but naturally these occupy the main bulk of the book. Here one can find in convenient form a short summary of the processes of digestion and absorption. In tabular form we can read off the exact composition of every ordinary food—calories, first-class proteins, vitamins, and minerals. Nor has the preparation of food been neglected: the changes due to cooking or other preparation are given, and, what is very important, the cost of various diets, including the cost of preparation. The authors point out how extremely diverse are the diets that are apparently compatible with perfect health: comparing not only race with race but different individuals of the same race and social standing. A short chapter is devoted to diet in disease; if we have a suggestion to offer it is that a dietary suitable for those who can only swallow fluids would fill a long-felt want. The book is carefully printed and well indexed, and in an admirable manner fills a real need.

Faith Healing. By C. W. J. BRASHER, M.D. Pp. 204. London: Gerald Duckworth & Co. Ltd. 1938. Price 5s.—Dr. Brasher has collected from all over the world instances of spontaneous cures of disease in unexpected cases. On the wrapper the publishers say that the object of the book is to show that the teachings of modern psychology are in no way incompatible with the belief in "Faith Healing." It would be unnecessary to contest this opinion. There is considerable philosophical and metaphysical speculation in the book and a whole-hearted endeavour to show the importance of the psychological approach to persons in ill-health. No experienced practitioner, whether orthodox or unorthodox, has ever doubted this. A good many instances of spontaneous cure in unexpected cases are cited: the examples are interesting, the explanations are conjectural. In an appendix full reports are published of five "cures" which occurred at Lourdes. These reports are long and verbose; there is no doubt that the patients declared themselves instantaneously cured. A careful study of the reports rouses considerable doubt whether the patients might not equally well have declared themselves cured before their visits to Lourdes had they been so minded. Since they were not so minded, the Lourdes visits were worth while. Dr. Brasher's collection of spontaneous cures in

unexpected cases, which he regards as illustrations of "faith-healing," recalls Diday's plea for recording "those rare cases which are registered in the annals of science to render diagnosis more circumspect."

Myocarditis (The St. Cyres Memorial Lectures). By J. S. GOODALL, F.R.C.S., F.R.S., and others. Pp. 152. London: Eyre & Spottiswoode Ltd. 1937. Price 10s. 6d.—In 1926 the late Viscountess St. Cyres founded and endowed, in memory of her husband, the St. Cyres Lectures on the Subject of Myocarditis, to be given annually. Six of the first seven lectures have now been published in the present volume. Unfortunately, no record has been kept of the fifth lecture, given by Sir Thomas Lewis, and this has, therefore, had to be omitted. The lectures published include two by Dr. Strickland Goodall on "Some general aspects of Myocarditis" and on "the Right Side of the Heart." Dr. R. O. Moon also deals generally with Disease of the Myocardium, and Dr. John Cowan "the Fibroses of the Heart," while a valuable lecture by Professor John Hay describes "Certain Aspects of Coronary Thrombosis." Perhaps the most welcome of all to English-speaking readers will be Professor Wenckebach's contribution on the "Heart and Circulation in a tropical avitaminosis (Beri-beri)." All of these lectures will repay careful study and the volume will be a useful addition to the book shelves of all those interested in diseases of the heart.

Modern Treatment in General Practice. Vol. IV. Edited by C. P. G. WAKELEY, D.Sc., F.R.C.S., F.R.S.E., F.A.C.S., F.R.A.C.S. Pp. xii., 440. Illustrated. London: Baillière, Tindall & Cox. 1938. Price 10s. 6d.—These Modern Treatment Volumes—now to be made into "Annuals"—should make a strong appeal to the General Practitioner for whom they are designed. They ably span the gap between the stereotyped text books, which depend on the clarity of the style of a single author for success, and the specialized monographs. The 1938 volume is a sound, practical work, and in fifty-two chapters covers a wide variety of subjects in almost every branch of medicine and surgery, the information being provided in many instances by specialists of repute. Particular value attaches to the second part of the volume, "Pitfalls in Diagnosis," which provides information which can be put into daily use. This section deals with differential diagnosis, and

as the first essential in treatment is accurate diagnosis, we would like to see the entire contents of future volumes written in this style. The book, as a whole, is well brought out and can be recommended with confidence to all medical men as a "refresher" and especially to the students of medicine and to the General Practitioners.

The Evolution of Chronic Rheumatism. By R. FORTESCUE FOX, M.D., F.R.C.P. Pp. 26. London: H. K. Lewis & Co. Ltd. 1938. Price 2s. 6d.—This expensive pamphlet is founded on a lecture delivered at the congress of the Royal Institute of Public Health a year ago. About ten pages are given up to discussing the causes of rheumatism, "rheumatic sequence," the simile of a spiral being used instead of the old vicious circle. There are useful diagrams of primordial causes. On the other ten pages the author airs his views on the treatment, and the necessity of observing the patient's reaction to changes of temperature is rightly stressed. A useful little pamphlet for spas and clinics.

A Survey of Chronic Rheumatic Diseases. Edited by R. G. GORDON, M.D., D.Sc., F.R.C.P., and others. Pp. viii., 338. Illustrated. London: Oxford University Press (Humphrey Milford). 1938. Price 18s.—The survey consists of a series of articles on the rheumatic diseases, contributed by contemporary authorities in commemoration of the bicentenary of the Royal National Hospital for Rheumatic Diseases, Bath. The group of physicians and pathologists in this country who are interested in the rheumatic diseases has been so active and clamant during the past two or three years that their views on this subject are generally well known, but although their contribution to this volume contains little that is new, it is an excellent summary of current opinion about these disorders. About half the content of the survey is contributed by medical authorities from America and the continent of Europe, and their varied views with regard to causation, pathology, and treatment will be read with the greatest interest. Hench's article, "Is rheumatoid arthritis a disease of microbic origin?" and Aschoff's on "Allergy in arthritis," are peculiarly thoughtful and suggestive. Whilst both are tentatively on the side of the microbial origin of rheumatic diseases, they reflect the general tendency of the present day to lay increasing emphasis on the importance of constitution, diathesis, and external factors. The infective

theory seems fated ultimately to assume a secondary rôle. The contributions on the importance of biochemistry and radiology in the diagnosis of rheumatism, and those on the pharmacology and hydrology of chronic rheumatism, will be found to be of great interest and practical value.

Introduction to Diseases of the Chest. By J. MAXWELL, M.D., F.R.C.P. Pp. xii., 328. Illustrated. London: Hodder and Stoughton Ltd. 1938. Price 12s. 6d.—Dr. Maxwell designed this book for the student, and presents in it a study of the clinical aspects of respiration, the correlation of history with physical examination, and describes the various special examinations which are applicable to respiratory disease. He also devotes some attention to methods of treatment. The major symptoms are adequately set forth, but without giving any verbal picture of the patient such as Hippocrates, or in later days Sir Thomas Watson could so vividly depict. In the discussion of "physical examination," the principles of inspection are clearly enunciated, but the student is not advised as to which parts of the hand and fingers are best calculated to transmit information from palpation. Percussion seems to be dealt with in a wholly non-musical fashion; yet Auenbrugger based his discovery of the art of percussion on his musical knowledge. Is "resonance" solely a question of "pitch" and "duration" of a sound without reference to "loudness" or "intensity"? Is the physical state determined by percussion really the depth of the column of air which lies beneath the percussed part: if so, how are the kettledrums in the orchestra tuned to varying notes by merely altering the tension of the drum-head? Is "Skodaic resonance" proved to be due to relaxation of lung above a pleural effusion? Why is no reference made to the difference between the area of superficial cardiac dulness which demonstrates the extent of precordium uncovered by lung and the deep dulness which denotes the extent of heart underlying the lung? The chapter on auscultation bespeaks a want of acquaintance with Laennec's writings. A classification which says "the normal breath sounds are vesicular" is nonsense, nor is it true that "vesicular breath sounds are normally heard over the whole of the lungs with the exception of a small area in the second right space, close to the sternum." It is misleading to tell students that bronchial breathing is an abnormal breath sound. It is a normal sound which may be heard in abnormal places. The classification and description of added sounds are

open to adverse criticism. Firstly because the meaning of the terms is not given, secondly because the explanation of why and where the several added sounds occur is by no means so certain as the author makes out, and thirdly because there is no justification for spelling *sibilus* "sibillus" as is done throughout the book. Is it fair to the student to tell him that succussion splash is pathognomonic of hydropneumothorax? Surely it does not exclude pus or a blood-stained effusion mixed with air. These may seem pedantic objections, but a teacher who is inexact in the use of words or ignorant of their meaning can hardly fail to mislead or confuse students who derive their instruction in clinical medicine from words spoken at the bedside or in the lecture-room. When one turns to the descriptions of special investigations, bacteriological, radiological and the like, the author becomes a more reliable guide. His directions for screening a chest and viewing a skiagram are workmanlike and practical. So are his occasional remarks on treatment, particularly his descriptions of lipiodol introduction and artificial pneumothorax. A good deal of attention is paid to the treatment of asthma, but no mention is made of the value of high altitude, especially in young asthmatics. Omitting the portions of the book which are open to criticism and appear limited to the first two sections, we find a great deal to praise in the accounts given of the various diseases and their treatment, and this includes five-sixths of the volume. Most of the faults lie in fifteen pages of Section 2, and there are three hundred and fifteen other pages which are very good.

Sick Children. Third Edition. By D. Paterson, M.D., F.R.C.P. Pp. iv., 604. Illustrated. London: Cassell & Co. Ltd. 1938. Price 12s. 6d.—That this book has reached a third edition within twelve months of the publication of the second edition is sufficient evidence of its general popularity. The excellent references and footnotes of original articles have been continued, whilst the appendix of recent examination papers will prove invaluable to students and those taking higher examinations in Children's Diseases. Advances in chemotherapy are very adequately dealt with, whilst the section on anaemia has been improved and a new footnote written on acute and chronic arthritis in infancy and childhood. Sonne dysentery has been particularly dealt with and special references made to epidemic jaundice. The illustrations and general production of this edition are very good indeed. The

index is thoroughly adequate and the heavy type of the various headings makes reference easy. This book can be most heartily recommended to students and practitioners requiring concise and up-to-date information compiled in a most readable form.

A Textbook of X-Ray Diagnosis by British Authors. Vols. I and II. Edited by S. C. SHANKS, M.D., P. KERLEY, M.D., M.R.C.P., D.M.R.E., and E. W. TWINING, M.R.C.S., L.R.C.P., D.M.R.E. Pp. (I) xii., 591; (II) xii., 458. Illustrated. London: H. K. Lewis & Co. Ltd. 1938. Prices 50s. (Vol. I), 42s. (Vol. II).—This authoritative work is most comprehensive and supplies a much-needed want in British works on this subject. The numerous contributors have united to give the most reliable and up-to-date information on their respective subjects, in concise and lucid form. The preliminary notes given in each section on radiographic technique and the diagrams and notes on the anatomy of the part, are very clearly and concisely described and are exceedingly helpful. The illustrations are far superior to those found in most radiological text-books and are really excellent, great pains having obviously been taken to secure the best possible results. The most recent advances in radiographic technique are described and their practical application explained. Copious bibliographies are supplied. All the articles are written in a most readable style, and the excellent paper and print make them a pleasure to read.

Anaesthesia and Analgesia for Nurses and Midwives. By J. K. WATSON, M.D. Pp. viii., 135. Illustrated. Bristol: John Wright & Sons, Ltd. 1938. Price 3s. 6d.—This small book on anaesthesia by Dr. Watson is a concise and well-written elementary treatise on this subject. Although it is described as a manual for nurses and midwives, its pages contain quite sufficient information for the average medical student as well, and with an additional chapter on premedication, which is so much a part of anaesthetic routine nowadays, it should make a special appeal to him. The printing is clear and the illustrations are excellent, but A.C.E. as an anaesthetic mixture should surely find no place in a modern text-book.

Editorial Notes

Resignation of Miss E. M. Johnston, Matron, B.R.I.

After ten years service as Matron to the Bristol Royal Infirmary, Miss E. M. Johnston has retired. At the Annual Reunion and Garden Party several presentations were made to her by the nursing staff, the laundry maids, the ward maids, the home maids, the workmen and by members of the Committee, medical staff and friends. Mrs. E. M. Harford, Chairman of the Nurse Committee, in making the presentation for the latter group, spoke of the many improvements that Miss Johnston had made in the nurses' régime—notably the system of holiday and off-duty times, whereby the nurses know six months ahead when they will be off duty and on holiday.

Miss Johnston has almost succeeded in arranging a ninety-six-hour-fortnight for nurses. She gave great support to the formation of the B.R.I. Nurses' League, obtained a hard tennis court for the Nurses' Home, established a special dietetic kitchen, and raised a fund for the restoration and redecoration of the Infirmary Chapel. At a time when there seems to be increasing difficulty in attracting recruits to the nursing profession, there is need of matrons who can contemplate innovations without dismay and can progress without losing hold of the continuity of the traditional spirit of sympathy and service which has inspired the nursing profession.

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Chair of Pathology.

THE appointment of Professor T. B. Davie to the Chair of Pathology in the University of Liverpool has caused great regret that he should be leaving Bristol after so short a time here. Yet his stay amongst us has been long enough to allow every one who came in contact with him to appreciate his worth as a pathologist, as a colleague and a friend. He leaves with the widest expressions of good wishes for his success and happiness in his old university, which has recalled him to fill so important an office.

In his place we welcome T. F. Hewer, a Bristol graduate, who after a distinguished career in our own university held a Commonwealth Fund Fellowship at Johns Hopkins University, and was afterwards at the Kitchener School of Medicine and the Wellcome Tropical Research Station at Khartoum. He left the Sudan to work in Liverpool, where during the past year he has been acting as Professor of Pathology pending the filling of the Chair by the election of Professor Davie. Professor Hewer is assured of a warm welcome when he returns to his old medical school here.

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Association of Physicians of Great Britain and Ireland.

THE Thirty-second Annual Meeting of the Association of Physicians of Great Britain and Ireland was held in Bristol on 3rd and 4th June. The Association visited Bristol previously in 1924, when a very successful meeting was presided over by the late Dr. George Parker, with Dr. J. A. Nixon as Secretary. At that time the University buildings had only recently been completed and were not yet available.

The present meeting was held in the Physics Theatre

of the University, and the members expressed admiration of its acoustic properties, the comfort of the seating, and the convenient arrangements for exhibiting slides and other illustrations of the communications. Great interest was shown in the exhibition in the Physics Laboratory of the Bragg-Paul Pulsator, which can maintain artificial respiration for long periods, and in Professor Berry's series of brains of mental defectives. The exhibits of pathological specimens by Professor Davie, Dr. Fraser and Dr. A. L. Taylor were admirable and excellently displayed. Dr. G. B. Bush exhibited skiagrams illustrating tomography and planegraphy. Dr. Thornton demonstrated a new method of preserving solutions of adrenalin. Clinical cases were exhibited in the Old Fort House, and included some rare conditions which excited considerable discussion.

The Annual Dinner was held in the Great Hall of the University, and over 100 members and guests were present at a very successful and enjoyable function in these beautiful surroundings. The speeches were of a high standard, especially that of the Lord Mayor, whose presence was much appreciated, in replying to the toast of the City of Bristol. Great credit is due to the President, Dr. J. A. Nixon, to Dr. C. Bruce Perry (Local Secretary), and to Dr. R. C. Clarke (Dinner Secretary) for the unqualified success of the entire meeting. Thanks are due to the Vice-Chancellor for permission to hold the meeting in the University.

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History of the Royal Fort.

THE following account of the Royal Fort was printed in the programme of the Association of Physicians:—

In 1642, when the Civil War broke out, Bristol endeavoured to keep out of the struggle. The City Council, recognizing that

the City would be at the mercy of any hostile artillery on the neighbouring hills, began a semi-circular line of fortifications based on the River Avon and extending over a circumference of three miles across the northern heights. Colonel Neunes, when placed in charge of the City by the Parliament, developed this line of defence and built several forts on it. One of these on St. Michael's Hill was called the Windmill Hill Fort and afterwards the Fort Royal. When Prince Rupert in 1643 besieged Bristol none of the forts was captured, but with the capitulation of the City they were handed over, and Windmill Hill fort was extended and greatly strengthened by being converted into a pentagonal fortress, mounting 22 guns and containing magazines and barracks within its rampart and moat. Its eastern or longest side was 300 feet in length, and the rampart between 10 and 12 feet in height. Prince Rupert made it his headquarters when it was completed in 1644, and renamed it Fort Royal. There are still left an entrance gateway with a house on each side of it, one being traditionally the Governor's house: the remains of two bastions, the southern and the south-eastern, and the foundations of the rampart between them (still visible in the garden of Royal Fort House): the entrance lane from St. Michael's Hill and a fine well with a copious spring of water and a cistern holding 10,000 gallons which until recently supplied the neighbourhood.

In 1645, after the battle of Naseby, Cromwell and Fairfax invested the City. Fairfax made his headquarters at Stoke Park, Stapleton, where Stoke Park Colony is now situated. On 23rd August the garrison of Fort Royal sallied out in storms of pouring rain to attack the besiegers, but they were driven back. On 10th September Cromwell's troops made a general assault in which the eastern suburbs of Bristol were captured. At 10 a.m. after three or four hours' fierce fighting Prince Rupert requested a parley. Both parties were anxious to save the city itself from destruction, so that terms were agreed to that evening, and on the next day, 11th September, 1645, the Prince marched out of Fort Royal with colours flying, accompanied by all his troops and adherents and their

baggage. Prince Rupert, mounted on a black charger and clad in scarlet and silver, was courteously accompanied by Fairfax over the Downs, and the city fell once again into the hands of Parliament. When the Civil War broke out again in 1648 Parliament voted large sums to repair the great Fort and the Castle. However, at the end of 1654, Cromwell ordered the destruction of the Castle, and in 1655 of the Great Fort. The work was costly and tedious, but at last the Fort was completely destroyed, with the exception of the gate-house, a corner tenement called "the Court of the Guard House," and a few other houses which were let as private dwellings by the Corporation in 1658-9.

Early in the eighteenth century the Tyndall family became tenants of certain houses in the Royal Fort. One of them, Thomas Tyndall, in 1753 built the beautiful mansion now known as Royal Fort House. His descendants occupied the House and the surrounding gardens until 1916, when the last surviving Miss Tyndall sold the property to Mr. H. H. Wills, who erected the present magnificent Physics Department of the University, leaving intact the Royal Fort House with its lovely gardens and the stately trees of the entrance drive.

(Compiled from the late Dr. George Parker's account of "Tyndall's Park, Bristol, Fort Royal and the Fort House therein," *Transactions of the Bristol and Gloucestershire Archæological Society*, vol. li., 1929.)

Obituary

C. A. H. GEE, M.B., Ch.B.

THE death of Dr. C. A. H. Gee, on 7th April, at the age of sixty-one, is a loss to Bristol that will be very keenly felt. He was an old student at the Bristol General Hospital, and after holding a resident appointment there, he commenced practice at Evercreech, Somerset. The war found him a very busy and active practitioner, but the claims of service in the field he found irresistible, and as soon as he could arrange for his work to be carried on, he joined the R.A.M.C. and served in France as a R.M.O. After the Armistice he resumed his practice at Evercreech. Gee had always been interested in skin work, and in 1923 he sold his practice, went to Portbury to live, and came on the B.G.H. staff as assistant to Dr. Kenneth Wills. In 1927 he was appointed Physician in charge of the skin department at the Children's Hospital, and held that appointment at his death. He built up a considerable reputation as a dermatologist, and his kindness and skill will long be remembered amongst a large circle of patients and practitioners. Dr. Gee married Miss M. Wren, a nurse at the Bristol General Hospital, to whom we tender our sincere sympathy. He leaves no family.

Meetings of Societies

Bristol Medico-Chirurgical Society

13th April.

Dr. T. M. LING: **"The Emotional Factor in Disease."** (Page 101.)

11th May.

Mr. F. W. WILLWAY: **"Problems in the Diagnosis and Treatment of Intracranial Lesions."**

The Medical Library of the University of Bristol

WITH WHICH IS INCORPORATED

The Library of the Bristol Medico-Chirurgical Society.

The following donations have been received since the publication of the list in April, 1938.

	July, 1938.
Professor E. W. Hey Groves (1)	4 volumes.
Mrs. M. Homfray (2)	1 volume.
Liverpool School of Tropical Medicine (3)..	1 ,,

Unbound periodicals have also been received from Professor E. W. Hey Groves, Dr. T. Milling, Professor C. Bruce Perry and Dr. J. Odery Symes.

THE ONE HUNDRED AND SIXTY-THIRD LIST OF BOOKS.

The figures in round brackets refer to the figures after the names of the donors. The books to which no such figures have been attached have either been bought from the Library Fund or received through the *Journal*.

Antill, J. M. and Warren, R. A. *The Emancipist* .. .. (1) 1936
Appleton, A. B., and others. *Surface and Radiological Anatomy* .. 1938
Bailey, Hamilton .. *Emergency Surgery* .. .. 3rd Ed. (1) 1938
Brasher, C. W. J. .. *Faith Healing* 1938
Buchanan, Scott .. *The Doctrine of Signatures* 1938
Byrne, J. Grandson .. *Studies on the Physiology of the Middle Ear* .. 1938
Cope, Z. .. .. .. *Actinomycosis* 1938
Geckeler, E. O. .. *Fractures and Dislocations for Practitioners* (1) 1937
Gray, H. .. .. .. *Anatomy, Descriptive and Surgical* .. (2) 1858
Hopewell-Ash, E. L. *Manipulative Methods in the Treatment of Functional Disease* 1935
James, P. R. .. .. *The Baths of Bath* 1938
Mathews, A. P. .. *Principles of Biochemistry* 1936
Modern Treatment in General Practice, Vol. IV 1938
Myocarditis—the St. Cyres Memorial Lectures 1937
Nordmann, O. .. .. *Praktikum der Chirurgie* .. 4th Ed. (1) 1938
V. Norman.. .. .. *Essentials of Modern Medical Treatment* .. 1936
Occupational Therapy—An Addendum to the Handbook for Mental Nurses 1938
P. E. P. .. .. .. *Report on the British Health Services* .. 1937
Philip, Sir R. .. .. *Collected Papers on Tuberculosis* 1937
Rea, R. Lindsay .. *Neuro-Ophthalmology* 1938
Rolleston, Sir H., and Moncrieff, A.A. *Practical Procedures*.. .. 1938
Sechehaye, A. .. .. *The Treatment of Tuberculous Affections with Umckaloabo* 1938
Shanks, S. C., and others (eds.). *Textbook of X-ray Diagnosis by British Authors*, Vols. I-II.. 1938
Sleeping Sickness Committee. *Minutes of Evidence taken by the Departmental Committee on Sleeping Sickness* (3) 1914
Survey of Chronic Rheumatic Diseases 1938
Treasury of Human Inheritance, Vol. II, Parts 1–3 1922–28

TRANSACTIONS, REPORTS, JOURNALS, ETC.

Collected papers of the Mayo Clinic, XXIX. (1937) 1938
Medical Annual, 1938 1938
Quarterly Cumulative Index Medicus, Vol. 22 (1937) 1938
Transactions of the Ophthalmological Society of the United Kingdom, Vol. LVII., Part 2 1938

Publications Received

From Messrs. Cassell & Co. Ltd.:

Sick Children: Diagnosis and Treatment. By Donald Paterson, B.A. Manitoba, M.D. Edin., F.R.C.P. Lond. 3rd Edition. Price 12s. 6d.

From Messrs. Gerald Duckworth & Co. Ltd.:

Faith Healing. By C. W. J. Brasher, M.D. Price 5s.

From Messrs. B. Fraser & Co.

The Treatment of Tuberculous Affections with Umckaloabo. By Adrien Sechehaye. Price 1s.

From Messrs. Hodder & Stoughton, Ltd.:

Introduction to Diseases of the Chest. By James Maxwell, M.D., F.R.C.P. Price 12s. 6d.

From Keesing's Medical Digest, Ltd.:

Keesing's Medical Digest. January 1st to March 31st, 1938. Annual price £1 1s.

From Messrs. Kegan Paul, Trench, Trubner & Co. Ltd.:

The Doctrine of Signatures. By Scott Buchanan. Price 7s. 6d.

From Messrs. H. K. Lewis & Co. Ltd.:

The Evolution of Chronic Rheumatism. By R. Fortescue Fox, M.D. (Lond.), F.R.C.P. Price 2s. 6d.

From Dr. M. F. Liston:

Non-Venereal Syphilis. By M. F. Liston, O.B.E., M.B., Ch.B.

From Messrs. E. and S. Livingstone:

Medicine for Nurses. By C. Bruce Perry, M.D., F.R.C.P. Price 5s.

From Oxford University Press:

Heart Disease and Pregnancy. By Crighton Bramwell, M.A., M.D., F.R.C.P., and Edith A. Longson, M.B., Ch.B., D.P.H. Price 8s. 6d.

The History of the Forceps. By Vilhelm Møller-Christensen. Price 20s.

Textbook of Nutrition. By J. A. Nixon, C.M.G., M.D., F.R.C.P., and Doreen G. C. Nixon, M.B., B.S., M.R.C.S., L.R.C.P. Price 7s. 6d.

From Messrs. John Wright & Sons, Ltd.:

British Journal of Surgery, Vol. XXV., No. 100. April, 1938. Price 12s. 6d.

A Synopsis of Physiology. 3rd Edition. By A. Rendle Short, B.Sc., M.D., F.R.C.S., and C. L. G. Pratt, M.A., M.Sc., M.D. Price 10s. 6d.

Anæsthesia and Analgesia for Nurses and Midwives. By J. K. Watson, M.D. Price 3s. 6d.

Local Medical Notes

EXAMINATION RESULTS.

University of Bristol.—Students of the University have recently passed the following examinations :—

M.D.—Mabel F. Potter.

M.B., CH.B.—*Second Examination. Pass :* G. S. Andrews (with distinction in Anatomy), J. L. Ashley, Marie L. Bartlett (with distinction in Physiology and Anatomy), R. C. Blackney, J. Brodie, Joyce W. Brown, K. L. Brown, N. J. Brown, J. D. Cardale, J. H. P. Davies-Sage (with distinction in Anatomy), Cecil M. Drillien, D. I. Fullerton, S. J. V. Gilson, F. J. Goddard, Hester M. Hammond, Kathleen M. A. Harland, Joyce Kennard, P. Legat, D. S. Maunsell, A. H. M. Oakes, Christine M. Rendell, F. B. Richards (with distinction in Anatomy), A. F. Rogers, A. R. Rowe, M. O. Skelton, J. C. Valentine, G. A. Walton, J. H. Wilkins.

M.B., CH.B., Section I.—*Final Examination. Pass :* Ruth M. Hunter.

M.B., CH.B., Section II.—*Final Examination. Pass :* Kathleen E. Byrt (with distinction in Forensic Medicine and Toxicology), K. J. V. Carlson, Margaret H. Davies, Eileen M. D. Knox, G. R. E. Maxted, Margaret E. Morgan, R. H. Owen (with distinction in Forensic Medicine and Toxicology), Mabel W. N. Tribe, A. H. Wright, W. H. G. Elliott, J. S. Richardson.

B.D.S.—*Second Examination. Pass :* F. C. Bryant, P. B. Carey, Margaret J. Griffith, G. K. G. Jennings (with distinction in Anatomy), Sarah Jones, P. M. Nicholas (with distinction in Anatomy), R. M. Sharp.

B.D.S.—*Third Examination. Pass :* F. C. Baker.

B.D.S.—*Final Examination. Pass :* F. P. Ewens.

L.D.S.—*Second Examination. Pass :* Jean M. Bryant, R. L. Hollington, G. J. Mills, V. T. Scard.

L.D.S.—*Third Examination. Pass:* D. G. Davies, P. Le Masurier, J. W. S. Jenkins, L. H. Barker-Tufft, J. R. Herbert, L. B. Howell, O. H. Minton, C. R. Sage, J. C. Jowett, R. B. Stiles.

L.D.S.—*Final Examination. Pass:* F. S. S. Baguley, J. F. Durie, C. F. Howell, C. C. Moore, L. K. A. S. Oxley, D. M. Sanders, R. V. Woods.

MIDWIFE TEACHERS' CERTIFICATE EXAMINATION.—PART II. *Pass:* Lilian M. Phillips.

Conjoint Board.—L.R.C.P., M.R.C.S.—*Pass:* J. L. Reynolds (Anatomy), Edith M. Wagstaff (Pharmacology and Materia Medica), Joyce S. Miller (Pharmacology and Materia Medica), *Ursula W. Wood (Medicine), *Myrtle M. Hutchins (Medicine), R. T. Moore (Pathology and Midwifery), Margaret E. M. Slater (Surgery).

* Qualified.

APPOINTMENTS.

Miss Helen Bell, Matron at Northampton General Hospital, has been appointed Matron at the Bristol Royal Infirmary.

Miss A. Cameron, Matron at Hereford Hospital, has been appointed Matron at St. Monica's Home of Rest.